FORM PTO-1390 (Modified) (REV 11-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR
19368-086997	09/6[illegible]602

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP99/10354	19 APR 2000	23 DEC 1999

TITLE OF INVENTION
VEHICLE REAR VISION SYSTEM WITH ELECTROCHROMIC MIRROR

APPLICANT(S) FOR DO/EO/US
MAGNA REFLEX HOLDING GMBH

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made.
9. ☒ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☒ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☐ Other items or information:

return postcard

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
09/869602	PCT/EP99/10354	19368-086997

21. The following fees are submitted:.

BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :

		CALCULATIONS PTO USE ONLY
☐	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2) paid to USPTO and International Search Report not prepared by the EPO or JPO	**$1,000.00**
☒	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but Internation Search Report prepared by the EPO or JPO	**$860.00**
☐	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO	**$710.00**
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4)	**$690.00**
☐	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4)	**$100.00**

ENTER APPROPRIATE BASIC FEE AMOUNT =	**$860.00**	
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**	

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	22 - 20 =	2	x $18.00	**$36.00**	
Independent claims	1 - 3 =	0	x $80.00	**$0.00**	
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**	
TOTAL OF ABOVE CALCULATIONS =				**$896.00**	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) **(check if applicable)**.			☐	**$0.00**	
SUBTOTAL =				**$896.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).			+	**$0.00**	
TOTAL NATIONAL FEE =				**$896.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).**			☒	**$40.00**	
TOTAL FEES ENCLOSED =				**$936.00**	
				Amount to be: refunded	$
				charged	$

☐ A check in the amount of to cover the above fees is enclosed.

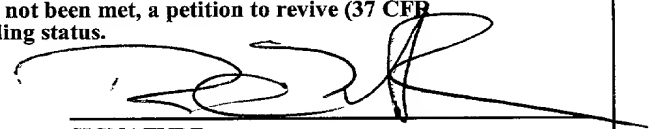
☒ Please charge my Deposit Account No. **50-1759** in the amount of **$936.00** to cover the above fees.
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **50-1759** A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

Robin W. Asher, Reg. No. 41,590
Clark Hill PLC
500 Woodward Avenue, Ste. 3500
Detroit, MI 48226-3435
(313) 965-8300



SIGNATURE

Robin W. Asher
NAME

41,590
REGISTRATION NUMBER

June 29, 2001
DATE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Art Unit: n/a

Examiner: n/a

Applicant(s): Heinz, Jurgen, A.

Serial No.: n/a

Filing Date: n/a

Title: Vehicle Rearview System with Electrochromic Mirror

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please preliminarily amend the application as follows:

IN THE SPECIFICATION:

A substitute specification (including abstract) is submitted herewith as a clean version in accordance with 37 CFR 1.121. No new matter has been added to the specification. A marked-up version using bracket for deletions and underlining for additions to the specification is also submitted herewith.

IN THE CLAIMS:

Please cancel claims 1-22.

New claims 23-44 have been added with a clean version attached hereto.

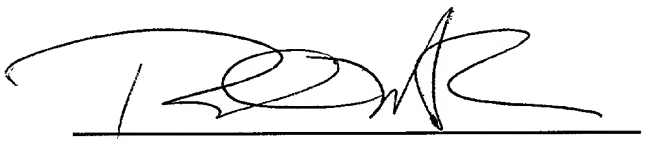
REMARKS

The substitute specification has been provided to include headings and the proper format under the MPEP. Additionally, grammatical language in the specification has been amended due to inaccuracies in the English translation of the PCT application.

Claims 1-22 have been cancelled from the application and new claims 23-44 have been added for examination on the merits.

Accordingly, it is believed that the application is in condition for more favorable considerations and allowance.

Respectfully submitted,



Robin W. Asher
Registration No. 41,590

Clark Hill P.L.C.
500 Woodward Ave., Suite 3500
Detroit, MI 48226
(313) 965-8665

Date: June 29, 2001
Attorney Docket No. 19369.086997

3/PRTS

MAGNA REFLEX HOLDING GMBH

Vehicle rear vision system with electrochromic mirror

The present invention relates to a vehicle rear vision system according to the preamble of the main claim.

Vehicle rear vision systems are known which have at least one rearview mirror unit provided with an electrochromic mirror, a control device and a vehicle power supply device, the control device being connected for its power supply with the vehicle power supply device and with the electrochromic mirror in order to control the reflection properties of said mirror in dependence on a control voltage. Triggering of the electrochromic mirror in relation to its transmission or reflection properties comes about through a d.c. voltage which may be adjusted in level according to light sensors. The triggering voltage varies here in a range between 0V and e.g. approximately 1.2V. The d.c. voltage is generated from the

control device whose essential components are generally located in the housing of the rearview mirror located in the interior of the vehicle (interior mirror), in dependence on the amount of glare. As a rule, both the interior mirror and rearview mirrors located on the exterior of the vehicle (exterior mirrors) are provided with electrochromic mirrors; generally the low control voltage is used for the uniform actuation of the interior mirror and of the exterior mirrors.

However, problems arise from the fact that the vehicle voltage of standard passenger vehicles is generally between 9V and 16V (nominal 12V), whilst the highest value of the variable control voltage is e.g. only 1.2V. The consequence of this is that, with a typical current through an electrochromic mirror of approximately 300mA, dissipation of approximately 4W has to be converted into heat. on devices according to the state of the art, this transformation generally happens by means of a power transistor which is accommodated in the very low volume housing of the interior mirror. In order to cool down the very high temperatures occurring, aluminium cooling plates which have to be attached to the power transistor are generally used.

This unavoidable dissipation proves to be particularly problematic in the miniaturisation of the electronics. According to the present state of the art it is perfectly possible to integrate the entire electronics for actuating an electrochromic mirror in an integrated power semiconductor component (power IC). A power IC of this kind would however have to be able to lead away the above-mentioned 4W dissipation to the environment in such a way that its inner chip

temperature remains below a critical value of generally 125°C. This in turn requires, as well as a suitable costly power housing of the power IC, a sufficiently large volume of surrounding air which has a temperature low enough to cool. A large space of this sort is however not generally available in the interior mirror housing (moreover this large space requirement works against the intended miniaturisation). on exterior mirrors, this problem is further intensified; as well as there being generally an even smaller space available, here also the increased basic temperature of the mirror housing (for instance as a result of intensive sunshine in the summer) has to be taken into consideration.

Thus the purpose underlying the present invention is to create a vehicle rear vision system which makes possible the accommodation of the control device in the smallest space, without the dissipation which occurs leading to an impairment in the functioning of the control electronics system.

This purpose is fulfilled by a vehicle rear vision system with the features of the preamble of the main claim in connection with the characterising features of the main claim.

Through the fact that the control device has a sheet-type heating resistor to carry away the heat occurring through electrical dissipation, an impairment of the functioning of the control electronics can be prevented by an "evacuation" of the heat that occurs. Secondly it is possible to divert the heat occurring in the sheet-type heating resistor to a place where it fulfils for example the useful function of a heating device (for example for a mirror surface).

Advantageous embodiments of the present invention are given in the dependent claims.

An advantageous embodiment provides for the heating resistor to be applied as a coating to a carrier material, such as for example the non-reflective rear side of the mirror of the rearview mirror unit, a plastics foil or a flat electrical line ("flex" or strip conductor connection). The coating can be applied to a variety of flat carrier materials, the heat that occurs here does not impair the functioning of the control electronics and can also be used to advantage (for example to stop clouding over of the glass or icing of objects).

A particular advantageous embodiment provides for the heating resistor to be disposed in meander shape on the carrier material, preferably a plastics foil. On the same plastics foil there can moreover be disposed a meander-shaped mirror glass heating system produced in the same way, it being possible to dispose the meander structures of the two resistors compactly beside one another or interlocking with one another. In order to constantly guarantee a condensation-free mirror, this foil can be provided on both sides with double-sided adhesive tape and be glued on one side to the rear side of the mirror and on the other to a glass support plate. As well as very good heat conduction towards the mirror to be heated, this moreover makes possible low-cost attachment of the mirror glass to the glass support plate.

A further advantageous embodiment of the present invention provides for the control device to have a unit for pulse-width modulation of a control signal

with a signal level, preferably at the level of the vehicle voltage and the unit for the pulse-width modulation to be connected to a converter, belonging to the control device, for converting the pulse-width modulated signal into an analog control voltage. It is particularly advantageous when the signal level is at the level of the vehicle voltage, to convey a signal generated from a signal generation unit located in the housing of the interior mirror to the exterior mirrors. In this case, the converter according to the invention is located in the region of the exterior mirror; the dissipation occurring in said mirror during the conversion of the pulse-modulated signal at the level of the vehicle voltage into an analog control voltage of a lower level is converted again in a heating resistor according to the invention. In so doing, the separate earth wire between interior mirror and exterior mirrors, usual in rear vision systems according to the state of the art, and necessary in order to balance the potential differences between the interior and exterior mirrors of the vehicle. This stems from the fact that, when a voltage is supplied from the interior mirror to the exterior mirrors at the level of the vehicle voltage, the potential differences are of considerably less significance than with direct transmission of the low control voltage (e.g. a maximum of 1.2V).

Further advantageous embodiments of the present invention are given in the remaining dependent claims.

The present invention is now explained with the aid of several figures. These show:

Fig. 1 a heating resistor according to the invention on the rear side of an electrochromic mirror,

Fig. 2 a cross-section through an exterior mirror according to the invention,

Fig. 3 a block diagram of a vehicle rear vision system according to the invention,

Figs. 4a and 4b two possible ways of arranging the wiring of a heating resistor according to the invention.

Fig. 1 shows a dissipating resistor 3 according to the invention, which in the following is called heating resistor and which is embodied in meander shape and disposed on the non-reflective rear side 2a of an electrochromic mirror 2 of a rearview mirror unit. The application of the heating resistor to the rear side of the mirror 2a can come about by means of metal coating in a plasma process, screen printing using resistor paste (the resistor paste is applied in the form of the desired heating element) or galvanic coating. The heating resistor 3 (i.e. the coating) can be of copper, silver or aluminium. In each case, the heating resistor is configured in lines or flat; a heating resistor voltage is released between the electrical connections 3a and 3b which represent the beginning and end of the heating resistor.

Likewise, a mirror glass heating system 6 is attached to the rear side 2a of the electrochromic mirror 2, which system in addition heats the mirror 2. This can also be disposed in meander shape; it proves particularly advantageous if, as shown in Fig. 1, the course of the mirror glass heating system 6 is designed complementary to the course of the heating resistor 3.

It is not absolutely necessary to dispose the heating resistor 3 directly on the electrochromic mirror 2. There is admittedly an advantageous heating effect here which helps to prevent icing or clouding over of the mirror surface, but other arrangements are also possible. Thus, for example, provision can be made for the heating resistor 3 to be applied to foil printed circuits ("flex", or "FPC" supply lines). These supply lines can for example provide the electrical connection between the control device and the electrochromic mirror or also connect individual elements of the control device to one another (see in this connection also Fig. 3).

Fig. 2 shows the cross-section of an exterior mirror according to the invention or an exterior mirror unit 5. This has an electrochromic mirror 2 which is electrically connected, in a manner which is not shown in detail, with a control device. This control device or parts of the control device (see Fig. 3) can be accommodated within the housing 9 of the exterior mirror unit 5 (in Fig. 2 only the heating resistor 3 belonging to the control device and lying inside the housing 9 is shown).

The housing 9 is connected via a web 19 with the exterior chassis 18 of an automotive vehicle. A glass adjustment drive 8 situated inside the housing 9 carries a glass support plate 7. To the side of the glass support plate 7 remote from the glass adjustment drive 8 is attached a heating resistor 3 according to the invention. This is connected with further elements, not shown, of a control device via electrical contacts 3a, 3b, which can be embodied as flexible cables. The electrochromic mirror 2 is attached to the side of the heating resistor 3 remote from the

glass support plate. The attachment of the heating resistor 3 between the glass support plate 7 and the electrochromic mirror 2 can come about in various ways. The heating resistor 3 can for example be applied as a solid coating to the rear side 2a of the electrochromic mirror.

A further possibility is that the heating resistor 3 is embodied as a foil composite. To this end, the resistor element running between the contacts 3a and 3b is enclosed between two foils. It is now possible to attach this foil composite as a form-fit, for instance by means of a snap-on plug connection, to the rear side 2a of the electrochromic mirror. Another variant provides for the outer sides of the foil composite to be self-adhesive. In this case, the heating resistor 3 ensures the secure connection of the mirror 2 on the glass support plate 7 (instead of tile self-adhesive exterior surface of the foil, a double-sided adhesive tape can naturally also be glued to the outer sides of the foil composite, which has the same function).

It is also possible to accommodate further elements of the control device, e.g. an integrated circuit, between the glass support plate 7 and mirror 2. This integrated circuit can either be applied directly to the rear side 2a of the mirror 2 or to a foil. This application can come about in SMD technology or chip-on board technology. An integrated circuit could also be accommodated within the foil composite described above. Heat-resistant plastics are preferably used as foils here.

Further elements of the control device, for instance a digital-analog converter, can likewise be accommo-

dated inside the housing 9 of the exterior mirror unit 5, for example inside the glass adjustment drive 8.

The above embodiments referred by way of example to the exterior mirrors shown in Figs. 1 and 2. The described embodiments are similarly applicable to interior mirrors.

Fig. 3 shows the diagrammatic construction of the whole vehicle rear vision system. This contains two rearview units, an interior mirror unit 4 as well as an exterior mirror unit 5. A vehicle power supply device, not shown in detail, provides a d.c. voltage of a nominal 12V. The vehicle voltage can however be between 5V and 24V, depending on the automotive vehicle. The vehicle power supply device is connected to the control unit in order to supply it with power. The exterior mirror unit 5 has one or two electrochromic mirrors, (respectively one on each side of the vehicle), the interior mirror unit has one electrochromic vehicle mirror.

A glare sensor 10 attached to the interior mirror and orientated in the direction of reflection of the electrochromic mirror (i.e. towards the rear of the vehicle), measures the incident light flux from the rear of the vehicle (for instance from vehicles travelling behind same). A daylight sensor 11, which is orientated e.g. in the direction of motion or towards one side of the vehicle, determines a further light flux. Sensors 10 and 11 are connected to a computing unit 20 of the control device for data transmission. Depending on the measurement values of the sensors, the amount of glare is determined by the computing unit 20, and converted into an analog control signal.

This analog control signal is then supplied to a transistor (see input 17a of transistor Q in Figs. 4a and 4b). The circuit shown in Figs. 4a and 4b, which will be described in detail later, makes available to the electrochromic mirror 2 a d.c. voltage varying between 0V and 1.5V according to the amount of glare. In dependence on this voltage, the reflection properties of the electrochromic mirror 2 alter in known fashion. The analog voltage 21 is e.g. between 0V and 1.5V. It can however, according to the embodiment, cover higher voltage regions, e.g. from 0V - 2.5V.

In addition to controlling the reflection properties of the interior mirror, the computing unit 20 also controls the reflection properties of at least one electrochromic mirror 2 of the exterior mirror unit 5. To this end, the computing unit 20 transmits an analog signal, as was for instance supplied to the electrochromic mirror 2 of the interior mirror unit 4, to the electrochromic mirror 2 of the exterior mirror unit 5. This signal can be transmitted e.g. directly. Fig. 3 shows a further possible way of transmission.

This possibility consists in the analog control signal being digitised first of all in an analog-digital converter 15, which is accommodated for instance in a "roof module," of an automotive vehicle, (according to the design of the computing unit 20, in some embodiments a micro-controller integrated in the computing unit 20 can already emit a digital signal). The signal digitized in the analog-digital converter 15 is led by means of a data bus to a door control apparatus 12. The door control apparatus 12 is designed as a node, which controls all the functions of the door, such as glass adjustment drive, mirror

glass heating, tilting mechanism drive, lighting devices and signal device.

The connection between the door control apparatus 12 and unit 14 shows a further variant of the transmission of the control signal to an electrochromic mirror 2.

The door control apparatus 12 belonging to the control device contains a unit for the pulse-width modulation of a control signal with a signal level at the level of the vehicle voltage (naturally, as well as the standard 12V vehicle voltage, other levels of voltage are possible). The pulse-width modulated brightness signal is led with a signal level at the level of the vehicle voltage to unit 14. Unit 14 has a converter, belonging to the control device, for converting the pulse-width modulated signal 13 into an analog control voltage. In order to avoid the heat problems depicted in the introduction to the specification, in this conversion a circuit arrangement as per Figs. 4a or 4b is needed. The low analog control voltage (preferably between 0V and 1.5V) is then led to the electrochromic mirror 2.

In the present example, the computing unit 20 is accommodated in the interior mirror unit. it is naturally possible to accommodate the computing unit 20 in the exterior mirror unit 5 also. As a result of the design according to the invention of a heating resistor, no heat problems here occur in the exterior mirror, the heat can even be used as available heat for heating the mirror surface. The computing unit can also be accommodated in other places, for example in the region of the door control apparatus 12 or of the roof module.

The embodiment given by way of example and shown in Fig. 3 thus shows a plurality of transmission paths between the computing unit 20 and an electrochromic mirror 2:

1. analog transmission
2. digitization and transmission by means of data bus
3. pulse-width modulation with a signal level e.g. at the level of the vehicle voltage.

It is naturally possible to use just one of the systems presented for signal transmission. For this, in the case of digital transmission by means of data bus, (preferably a UART or CAN protocol is used) e.g. a digital-analog converter is necessary for converting the data bus signal into an analog control voltage.

Fig. 4a shows a circuit for minimisation of heat development in the region of the transistor Q. The sheet-type heating resistor 3 is connected in series to a parallel circuit of a control transistor Q and an electrochromic mirror 2. Between points 23 and 24 is released a voltage at the level of the vehicle voltage. Through input 17a, a control voltage or a control signal is supplied to the transistor Q, by which means the current passing through transistor and resistor is adjusted. Depending on this transient current, a different component voltage is released on the heating resistor R such that a residual voltage of a different level remains on the electrochromic mirror 2 and is for example in the region between 0V and 1.5V. The use of a circuit as per Fig. 4a is particularly advantageous since the dissipation occur-

ring in the transistor is particularly low therein, (instead of the 4W mentioned initially in power transistors according to the state of the art, here e.g. only 0.5W are to be converted in the transistor).

Fig. 4b shows a further embodiment of a circuit arrangement according to the invention. Between points 23 and 24 there is a voltage of e.g. 12V (the level of the vehicle voltage). In this embodiment, the transistor Q, which is actuated by a control signal 17a, the heating resistor 3 and the electrochromic mirror 2 are connected in series. As in the arrangement shown in Fig. 4a, the heating resistor is disposed flat (e.g. in a spiral or meander shape).

The circuits shown in Figs. 4a and 4b should be so laid out that the maximum control voltage on the electrochromic mirror is less than 25% of the nominal vehicle voltage.

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Patent Claims

1. Vehicle rear vision system (1) with at least one rearview mirror unit provided with an electrochromic mirror (2), with a control device as well as a vehicle power supply device, the control device being electrically connected for its power supply to the vehicle power supply device and to the electrochromic mirror in order to control the reflection properties of said mirror in dependence on a control voltage and to a sheet-type heating resistor,
characterised in that
the control device has the sheet-type heating resistor (3) as dissipating resistor to carry away the electrical dissipation loss resulting from the generation of the control voltage as heat.

2. Vehicle rear vision system according to claim 1, characterised in that the control voltage is less than 25% of the vehicle's voltage.

3. Vehicle rear vision system according to one of the preceding claims, characterised in that the rearview mirror unit is embodied as an interior mirror unit (4) or an exterior mirror unit (5).

4. Vehicle rear vision system according to claim 3, characterised in that both the interior (4) and/or exterior mirror unit (5) have electrochromic mirrors (2) which are respectively connected to the control device.

5. Vehicle rear vision system according to claim 3, characterised in that parts of the control device are accommodated in the housing (9) of the

interior (4) or exterior mirror unit (5).

6. Vehicle rear vision system according to one of the preceding claims, characterised in that the heating resistor (3) is applied as a coating to a carrier material.

7. Vehicle rear vision system according to claim 6, characterised in that the carrier material is the non-reflective rear side (2a) of the mirror (2) of the rearview mirror unit, a flat electrical line or a foil.

8. Vehicle rear vision system according to claim. 6, characterised in that the coating is made of copper, silver or aluminium.

9. Vehicle rear vision system according to Claim 7, characterised in that the heating resistor (3) is disposed in meander shape on the carrier material (2).

10. Vehicle rear vision system according to claim 9, characterised in that, on the same carrier material as that on which the heating resistor (3) is disposed in meander shape, there is disposed a mirror glass heating system (6) is disposed belonging to the rearview mirror unit.

11. Rear vision system according to one of the preceding claims, characterised in that the heating resistor (3) is connected to the electrochromic mirror (2) either as part of the material of same or as a form-fit.

12. Vehicle rear vision system according to one of the preceding claims, characterised in that the mirror is disposed on a glass support plate (7)

belonging to the rearview mirror unit, which plate is orientated towards the non-reflective rear side of the mirror, and the heating resistor (3) as well as further elements of the control device are disposed between the mirror and the glass support plate.

13. Vehicle rear vision system according to one of the preceding claims, characterised in that elements of the control device are arranged in a glass adjustment drive (8) belonging to the rearview mirror unit.

14. Vehicle rear vision system according to one of the preceding claims, characterised in that the control device contains an integrated circuit.

15. Vehicle rear vision system according to claim 14, characterised in that the integrated circuit is applied directly to a foil.

16. Vehicle rearview system according to one of the preceding claims, characterised in that the control device has at least one light sensor (10, 11) disposed preferably in the region of incident light of an electrochromic mirror, and which generates a control signal to generate a control voltage in dependence on the incident light flux.

17. Vehicle rear vision system according to one of the preceding claims, characterised in that the control device has a unit for the pulse-width modulation (12) of a control signal with a signal level, preferably at the level of the vehicle's voltage, and the unit for the pulse-width modulation is connected to a transformer (14), belonging to the control device, for converting

the pulse-width modulated signal (13) into an analog control voltage.

18. Vehicle rear vision system according to one of the preceding claims, characterised in that the control device has an analog-digital converter (15) for the digitization of a control signal and the analog-digital converter is connected via a data bus to a digital-analog converter in order to convert the digital signal into an analog control voltage.

19. Vehicle rear vision system according to claim 18, characterised in that the data bus protocol is based on a UART or CAN system.

20. Vehicle rear vision system according to one of the preceding claims, characterised in that the heating resistor (3) is connected in series to a parallel connection consisting of at least one electrochromic mirror (2) and a transistor.

21. Vehicle rear vision system according to one of claims 1 - 19, characterised in that the heating resistor (3) is connected in series to an electrochromic mirror (2) and to a transistor (17) placed in series to same.

22. Vehicle rear vision system according to one of the preceding claims, characterised in that the electrical connections within the control device and/or between the control device and electrochromic mirrors are realised as foil printed circuits.

FIG. 1

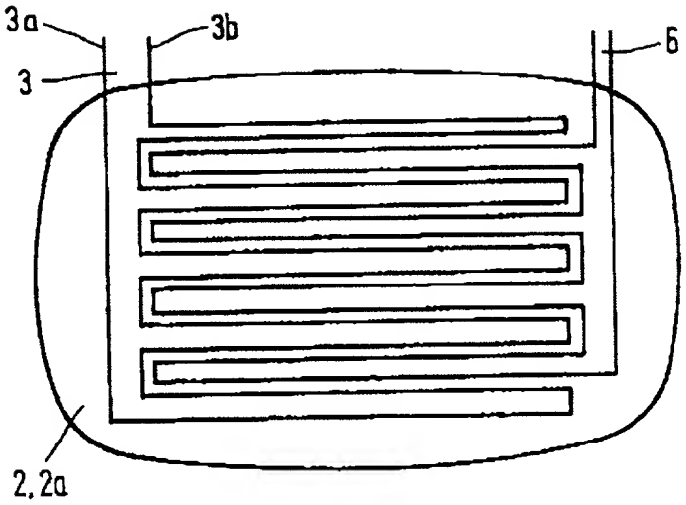


FIG. 2

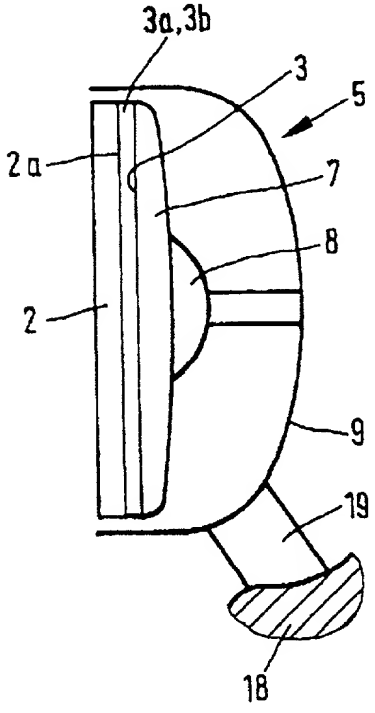


FIG. 3

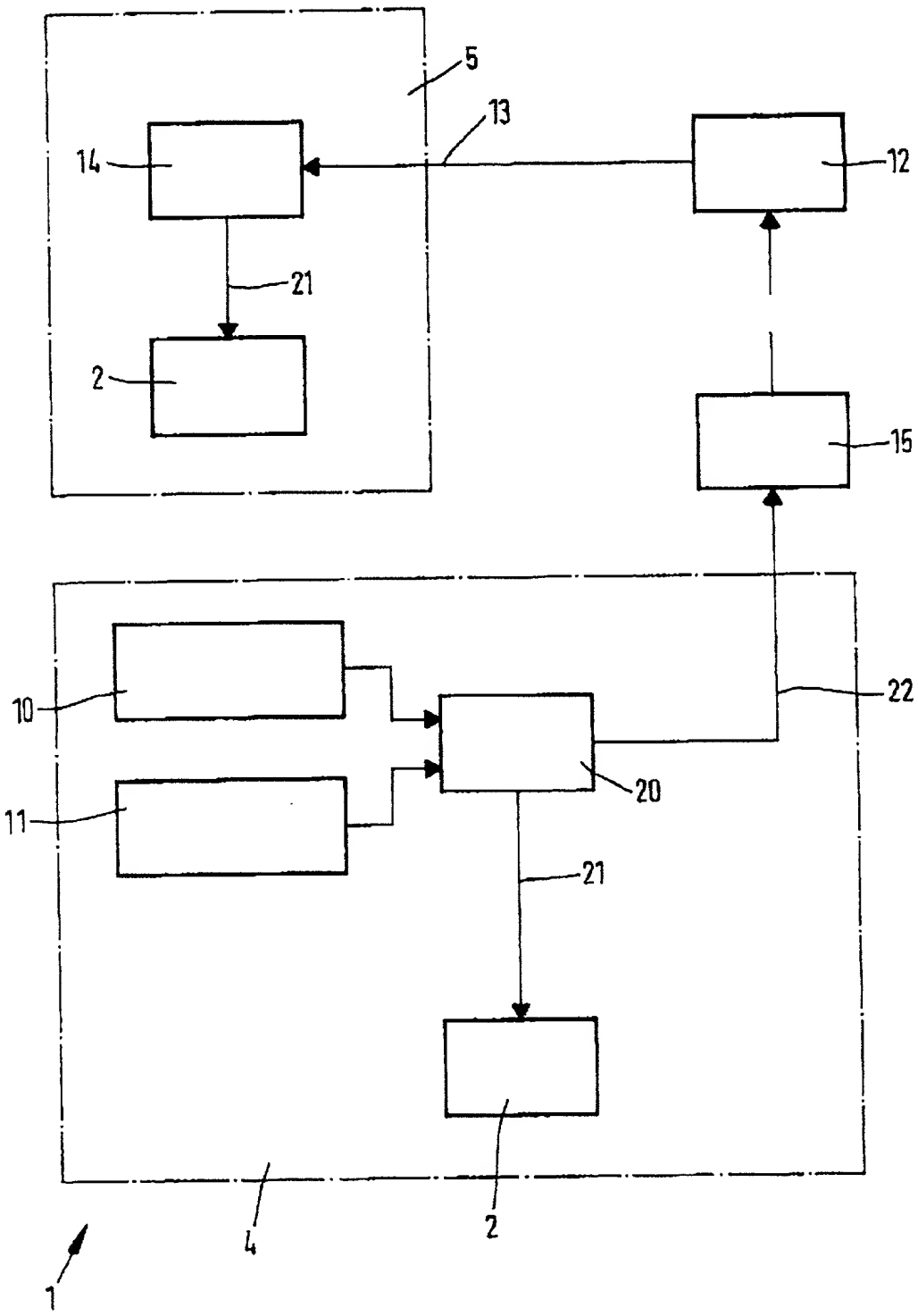


FIG. 4a

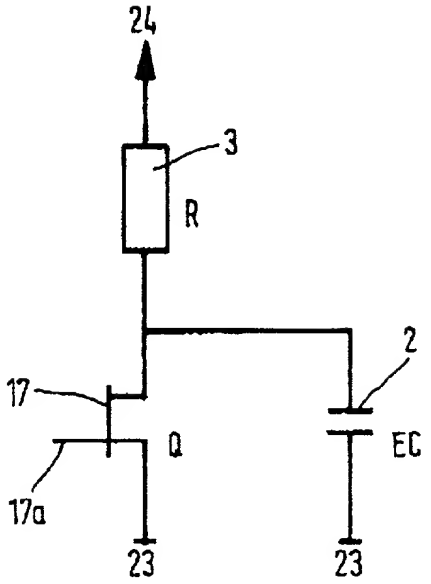
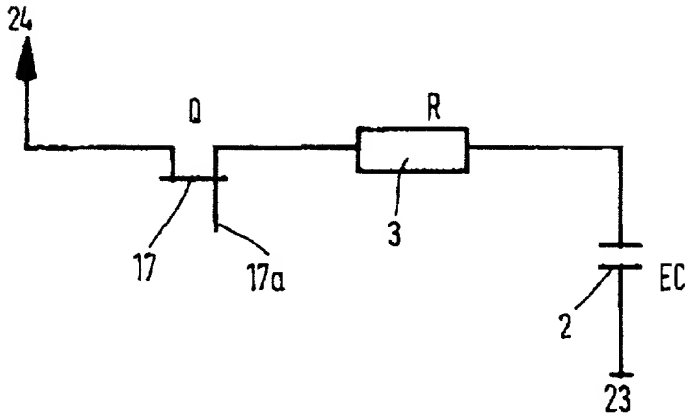


FIG. 4b



MAG 98/19 US/PCT

Docket No.

Declaration and Power of Attorney For Patent Application

English Language Declaration

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Vehicle Rear Vision System With Electrochromic Mirror

the specification of which

(check one)

☒ is attached hereto.

☐ was filed on _____ as United States Application No. or PCT International Application Number _____ and was amended on _____ (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section 119(a)-(d) or Section 365(b) of any foreign application(s) for patent or inventor's certificate, or Section 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate or PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)			Priority Not Claimed
19860941.9	Germany	12/29/98	☐
(Number)	(Country)	(Day/Month/Year Filed)	
(Number)	(Country)	(Day/Month/Year Filed)	☐
(Number)	(Country)	(Day/Month/Year Filed)	☐

I hereby claim the benefit under 35 U.S.C. Section 119(e) of any United States provisional application(s) listed below:

(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)
(Application Serial No.)	(Filing Date)

I hereby claim the benefit under 35 U. S. C. Section 120 of any United States application(s), or Section 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. Section 112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, C. F. R., Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)
(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(list name and registration number)*

Robin W. ASHER - Registration No. 41,590

David J. SIMONELLI - Registration No. 36,680

Daniel H. BLISS - Registration No. 32,398

Laurie EBLING SIMONELLI - Registration No. 34,153

Beverly M. BUNTING - Registration No. 36,072

Joseph G. BURGESS - Registration No. 33,362

Gerald E. MCGLYNN, III - Registration No. 33,737

Brian S. PICKELL - Registration No. 45,013

Send Correspondence to: **Bliss McGlynn, P.C.**
2075 West Big Beaver Road
Suite 600
Troy, Michigan, 48084-3443, U.S.A.

Direct Telephone Calls to: *(name and telephone number)*
Mr. Robin ASHER - 248 649-6090

Full name of sole or first inventor Dipl.-Ing. Jürgen A. Heinz
Sole or first inventor's signature Date
Residence ~~Assamstraudt, Germany~~ Rothenburg, Germany
Citizenship Germany DEX
Post Office Address ~~Schindstrasse 3, D-97959, Assamstraudt, Germany~~ Wilhelm-Ziegler-Weg 23 D-91541 Rothenburg, Germany

Full name of second inventor, if any
Second inventor's signature Date
Residence
Citizenship
Post Office Address